

CLAIMS

1. A method of obtaining high range resolution in a radar system, the method comprising the steps of:-
 - a) generating a radar pulse;
 - 5 b) modulating the radar pulse;
 - c) transmitting the modulated radar pulse;
 - d) receiving a radar pulse;
 - e) modulating the received radar pulse; and
 - f) processing the modulated radar pulse to obtain range information;
- 10 characterised is that step b) comprises applying a time-dependent phase shift, changed at discrete time intervals, to the radar pulse at substantially the radar transmission frequency, and step e) comprises applying a time-dependent phase shift, changed at discrete time intervals, to the received radar pulse at substantially the radar transmission frequency;
- 15 and in that step f) comprises sampling the received signal at discrete time intervals which are an integral number of the time intervals of the time-dependent phase shift.
2. A method according to claim 1, wherein the time-dependent phase shift comprises a synthesised sequence.
- 20 3. A method according to claim 1, wherein the time-dependent phase shift comprises an arbitrary sequence.
4. A method according to anyone of the preceding claims, wherein the time-dependent phase shift produces a predetermined phase profile.
5. A method according to claim 4, wherein the predetermined phase profile
25 comprises a quadratic phase profile.
6. A radar system comprising:-

means for generating a radar pulse;

means for modulating the radar pulse;

means for transmitting the radar pulse;

means for receiving a reflected radar pulse;

5 means for modulating the received radar pulse; and

means for processing the modulated received radar pulse to obtain range information;

characterised in that the means for modulating the radar pulse includes a phase shifter which applies a time-dependent phase shift, which is changed at
10 discrete time intervals, at substantially the radar transmission frequency, and the means for modulating the received radar pulse includes a phase shifter which applies a time-dependent phase shift, which is changed at discrete intervals, at substantially the radar transmission frequency;

and in that the means for processing the modulated received radar pulse
15 includes sampling means for sampling the received signal at discrete time intervals which are an integral number of the time intervals of the time-dependent phase shift.

7. A system according to claim 6, wherein each phase shifter is driven in accordance with a synthesised sequence.

20 8. A system according to claim 7, wherein the synthesised sequence is implemented by a plurality of discrete logic components.

9. A system according to claim 7, wherein the synthesised sequence is implemented by a field programmable gate array.

10. A system according to claim 6, wherein each phase shifter is driven in
25 accordance with an arbitrary sequence which is provided by a memory device.

11. A system according to anyone of claims 6 to 10, wherein the means for modulating the radar pulse includes a local oscillator and first mixing means, the local oscillator providing a signal for mixing with the radar pulse in the first mixing means.
- 5 12. A system according to claim 11, wherein the local oscillator signal is phase shifted prior to mixing with the radar pulse.
13. A system according to claim 11, wherein the local oscillator signal is mixed with the radar pulse prior to being phase shifted.
- 10 14. A system according to anyone of claims 11 to 13, wherein the means for modulating the received radar pulse includes a local oscillator and second mixing means, the local oscillator providing a signal for mixing with the received radar pulse in the second mixing means.
- 15 15. A system according to claim 14, wherein the local oscillator signal is phase shifted prior to mixing with the received radar pulse.
- 16 16. A system according to claim 14, wherein the received radar pulse is phase shifted prior to mixing with the local oscillator signal.
17. A system according to anyone of claims 11 to 16, wherein a single local oscillator is utilised which provides a local oscillator signal to both the radar pulse and the received radar pulse.
- 20 18. A system according to claim 17, wherein a single phase shifter is utilised for both modulation of the radar pulse and modulation of the received radar pulse.
19. A system according to anyone of claims 6 to 18, wherein each phase shifter comprises a digital phase shifter.
- 25 20. A system according to claim 19, wherein the digital phase shifter comprises a monolithic microwave integrated circuit.

21. A method of obtaining high range resolution in a radar system substantially as hereinbefore described with reference to Figure 3 to 6 of the accompanying drawings.
22. A radar system substantially as hereinbefore described with reference to
5 of the accompanying drawings.